

Magnetism

How was the magnet discovered ?

2000 years ago, the ancient Greeks found type of black rocks located in an area named 'Magnesia'

This type of rocks has an attractive force to any material made of iron.



So, Scientists called this black rock ((natural magnet)) and its attractive force ((Magnetism))

Types of magnet are :

1- Natural magnet.

2- Artificial (man-made) magnet.

1- Natural magnet

- ** It is a black rock.
- ** It is one of the iron ores which is known as ((Magnetite)).

2-Artificial magnet

It has different shapes and sizes.



Rectangular magnet



Horse-shoe magnet



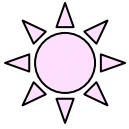
Ring
(round magnet)



Bar magnet



Magnetic needle



The magnet attracts some materials and doesn't attract the others!!

Materials

a. Magnetic materials

b. Non-magnetic materials

<p><i>They are the materials which are attracted to the magnet.</i></p> <p><i>Examples: Iron, nickel, steel and cobalt.</i></p>	<p><i>They are the materials which are not attracted to the magnet.</i></p> <p><i>Examples: chalk, glass, wood, leather and plastic.</i></p>
---------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------



Activity

Observation :

Pins and iron nails are attracted to the magnet.
Chalk, glass, spoons and copper wires are not attracted to the magnet.

Inference:

The materials that are attracted to the magnet are called magnetic materials and that are not attracted to the magnet are called non-magnetic material.



Magnet is used in making the doors of refrigerators and the small toys sticking on them.

To collect more information about the magnet, we must know:

Firstly : the properties of the magnet.

Secondly: the use of the magnet.

Firstly: The properties of the magnet

- 1- the magnet has two poles
- 2- The freely moving magnet always takes a fixed direction, which is North-South direction.
- 3- The like (similar) magnetic poles repel each other, but the unlike (opposite) magnetic poles attract each other.
- 4- The magnet is surrounded by an area called ((Magnetic field)).



1- The magnet has two poles.

Activity – **the magnet has two poles.**

Step:

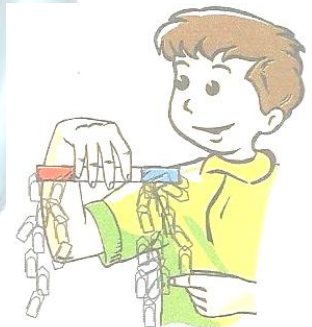
Approach a bar magnet to the metallic paper clips as in figure.

Observation:

The greatest number of the metallic paper clips is attracted at the two ends of the magnet, then it decreases gradually until it disappears in the middle.

Inference:

The regions of the magnet which have the most attraction force are the two ends which are called ((two poles of magnet)).



Two poles of magnet (magnetic poles)

It is the regions of magnet at which most of the attraction force (magnetism) is concentrated.

Note

The north pole is usually red-colored, but the south pole is usually blue-colored. Magnetism is concentrated at its two poles and decreases gradually until it disappears in its middle.



2- the freely suspended magnet always takes a fixed direction

Activity - prove that the freely moving magnet takes a fixed (north-south) direction.

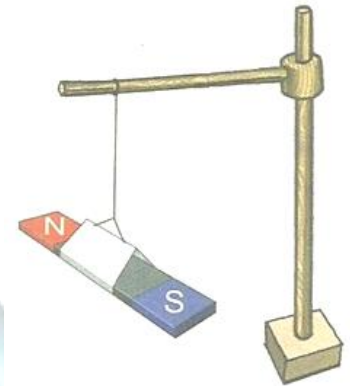
Steps

Move the magnet to the right side or left side slightly, then leave it to stabilize again.

Repeat the previous step for several times.

Observation

In each time, one pole of the magnet tries to search for the north direction of the Earth, while the other pole tries to search for the south direction.



Inference:

The freely suspended magnet always takes a fixed direction which is (North-south) direction.

- The pole of magnet which points to the north direction is called (**north pole N**), but the pole of magnet which points to the south direction is called (**south pole S**)



3- like magnetic poles repel each other, but the unlike attract each other.

Activity - to prove that like magnetic poles repel, but unlike magnetic poles attract.

Steps

1 - bring two bar magnets and hang one freely by a thread. Then leave it to settle.

2 - Approach the **north pole** of the other magnet to the **north pole** of the hanging magnet.

** the two north poles **repel** each other.

3 - approach the **south pole** of the magnet to the **south pole** of the hanging magnet.

** the two south poles **repel** each other.

4 - approach the **north pole** of the magnet to the **south pole** of the hanging magnet.

** the north pole **attracts** the south pole.

Inference:

The similar magnetic poles **repel** each other, but the opposite magnetic poles **attract** each other.



4- The magnet is surrounded by an area called((magnetic field)).

Magnetic field:

It is the space around the magnet in which the effect of magnetic force appears.

Magnetic force:

It is the ability of the magnet to attract the magnetic materials existed in its field.

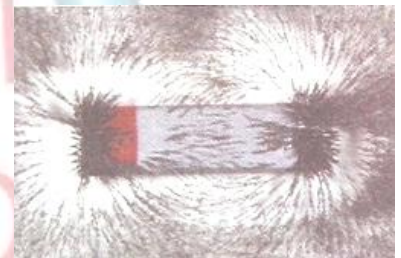
**** The magnetic force is an invisible one so, we use iron filings to show the magnetic field.**

Activity- showing the magnetic field using iron filings.

Steps :

1 - put a bar magnet horizontally on a table, then put a glass sheet on it.

2 -sprinkle some **iron filings** on the glass sheet, then knock on it slightly.



Observation :

**** Iron filings** are arranged around the magnet in a regular way.

**** the biggest amount of iron filings** are assembled at the two poles of the magnet.

Inference :

**** the magnetic field** around the magnet takes a regular shape.

**** the greatest magnetic force** of the magnet is concentrated at the two poles of magnet.

Secondly: The uses of the magnet

Uses in making (the magnetic compass)

Historical theory:

Chinese the first who uses free spins magnet rock to lead the army through dense foggy areas.

** in 1600 William Gilbert the first who made magnetized needle to be light for spinning freely. And it was the basic idea in making the compass.

The structure of magnetic compass:

It consists of :

A light and small magnet that can spin freely around a fixed axis., where

The north pole of this magnet refersto the north direction of earth and south pole refers to the south direction of earth.



The compass

The importance of the magnetic compass:

It is used to identify the main four geographical directions.

Activity -- how can you make a model of compass??

Observation

The piece of cork with the magnetic needle moves (floats) freely, then stabilizes, where it takes the north-south direction.



Inference:

The compass is a magnetic needle that takes a fixed direction which is North-south direction.

G.R. The compass is used to locate the main four direction!!!

Because the north and south poles of its magnetic needle always point to the north and south directions of the earth.

Vocabulary

Magnetism	المغناطيسية	Ancient	قديم
Magnetite	المجانتيت	Artificial	صناعي
Attractive force	قوة التجاذب	Bar	قضيب
Magnetize	يمغنت	Leather	جلد
Needle	ابرہ	Ring	حلقة
Attract	يجذب	Non-magnetic	غير مغناطيسي
Samples	عينه	Approach	يقترّب
Paper clips	دبوس ورق	Direction	اتجاه
Repel	يتنافر	Magnetic field	مجال مغناطيسي
Poles	اقطاب	North	شمال
Suspended	معلق	South	جنوب
Regions	مناطق	Concentrated	مركز
Middle	وسط	String	خيّط
Horizontally	افقيا	Fixed	يثبت
Settle	يستقر	Slightly	قليلا
Hang	يلقى	Sprinkle	ينثر
Assembled	يتجمع	Chinese	الصينين
Army	الجيش	Spins	يدور - يلف
Dense foggy	ضباب كثيف	Cork	فلين
Float	يطفوا	basin	وعاء

Questions on lesson 3

- 1- the natural magnet is a Colored rock.
- 2- The two types of the magnet are and
- 3- The natural magnet is one of the Ones which is known by
- 4- And Are from the shapes of the artificial magnet.
- 5- is made of magnetite.
- 6- Materials are classified according to their ability to magnetization into
And Materials.
- 7- And are from the magnetic materials.
- 8- And are from the non-magnetic materials.
- 9- The magnet has poles, one of them is called and the other
is called
- 10- The Pole the magnet always refers to the south direction of earth.
- 11- The magnet has the most powerful of attraction at its

12- A freely suspended magnet always takes direction.

13- The like poles Each other, whereas the unlike poles each other.

14- The is the space surrounding a magnet in which the magnetic force appears.

15- Is the ability of the magnet to attract the magnetic materials existed in its field.

16- The English scientist made a magnetized needle which is used nowadays in making

17- The compass is used to identify the

18- The sailors use During sailing in the ocean.

19- The compass always points to the direction of earth.

Choose the correct answer:

1 - the natural magnet is made of one of the iron ores called.....

- a. magnetite b. magnetism c. magnesia d. hematite

2 - all the following materials are attracted to the magnet except.....

- a. iron b. nickel c. cobalt d. chalk.

3 - the magnet has Poles

- a. one b. two c. three d. four

4 - the similar magnetic poles each other.

- a. attract b. repel c. do not affect d. eat

5 - when a magnet is hanged freely, its north pole is directed towards the direction of earth.

- a. north b. south c. east d. west

6 - if you put the north pole of a magnet near the south pole of another magnet, they will....

- a. repel b. attract. c. have no effect d. a , b and c

7 - the area that is around the magnet, where its magnetic properties appear is called a

- a. magnetic pole. b. magnetic substance c. non-magnetic s. d. magnetic field.

8 - the compass is used to locate the

- a. temperature. b. main four directions c. magnetism d. a, b and c

9 - the magnetic needle always settles at the Direction.

- a. north east b. east west c . north south d. west south.

Write the scientific term :

1 - the materials that are attracted to the magnetite.

2 - the pole of the magnet which points to the north direction of the earth.

3 - the space around the magnet in which the magnetic force appears.

4 - a set that is used for locating the main four geographical directions.

Give reasons for :

1 - copper is a non-magnetic material?

2 - one of the poles of magnet is north pole and the other is south pole?

3 - the compass is used to locate the main four directions?

4 - wood is not a magnetic material?

What happens if :

1 - a magnet is hung to move freely.

2 - you approach the north pole of magnet to south pole of another magnet?

3 - you get a magnet close to a mixture of iron pins?

My wishes, Mr Ibrahim Elsayed

للمزيد اضغط هنا

